Success Through Stewardship: White Sturgeon Monitoring and Assessment in the Lower Fraser River, BC

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Abstract
An ongoing population and migration assessment of white sturgeon (*Acipenser transmontanus*) in the lower Fraser River, BC, is being conducted by the Fraser River Sturgeon Conservation Society (FRSCS), a non-profit organization dedicated to the conservation and restoration of wild Fraser River white sturgeon. The significant volunteer-driven sturgeon tagging program has coordinated activities and in-kind contributions from true stewards of the resource: sport fishing guides, recreational, commercial, and aboriginal fishermen, test fishery and enforcement personnel, and various fishery monitors. The program has gathered sponsorship and support from provincial, federal, and aboriginal governments, plus non-government institutions, associations, and foundations. Under the program, which commenced in November 1999, volunteers are trained and supported by a professional biologist and program manager. Volunteers are trained to tag captured sturgeon with passive integrated transponder (PIT) tags, record tag numbers from recaptured sturgeon, measure and assess the condition of captured sturgeon, and secure and transfer the data. Over 12,000 PIT tags have been applied to sturgeon during the first three years of the program within a study area that spans over 130 linear kilometers from the Fraser Canyon (near Yale) to the Fraser estuary.

Historically, by the late 1800s, an aggressive and unregulated commercial fishery for sturgeon was established on the Fraser River, and several million pounds were harvested in just a few years. As a result, the sturgeon population collapsed, as did the commercial fishery. Over the next several decades, limited commercial and retention sport fisheries continued to apply pressure to the remaining sturgeon population. In 1994 the province of B.C imposed catch-and-release sport fishing regulations, and local aboriginal fisheries authorities elected voluntary retention moratoriums. A 5-year Fraser sturgeon research initiative was implemented in 1995 by a team of B.C. provincial fisheries biologists and resource managers. In 1998, a group of dedicated sturgeon enthusiasts from the lower mainland of B.C. came together to work with the provincial government to expand the scope and scale of the provincial sturgeon initiative in the lower Fraser River and estuary. This group, which formed the FRSCS, now includes federal and provincial fisheries biologists, commercial, recreational, and First Nation fishermen, sport fishing guides, test fishery operators, tackle shop owners, conservationists, and federal, provincial, and First Nation resource enforcement officers. Fraser River white sturgeon are currently listed as "vulnerable" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and are "Red" listed by the province of B.C. (rank S-2, imperiled).

Under the current tagging and recapture program, which commenced in November 1999, volunteers are trained and supported by a professional biologist/program manager and a field coordinator. Sturgeon are tagged with uniquely numbered passive integrated transponder (PIT) tags. Program volunteers are trained to scan captured sturgeon for the presence of a PIT tag, record tag numbers from recaptured sturgeon, apply PIT tags to untagged sturgeon in good condition, take measurements (fork length and girth), carefully release sturgeon, and secure and transfer the data. Quality assurance measures are rigorously applied to all field and data collection activities to ensure that program integrity and data reliability is maintained at a very high level.

A First Nations (aboriginal) stewardship component of the core FRSCS sturgeon tagging program provides education and awareness of sturgeon conservation and protection issues to Fraser First Nation communities, and creates opportunities for hands-on program involvement for First Nation fishermen. Each year, several thousand

white sturgeon are unintentionally captured in gill nets deployed in the lower Fraser River during First Nation food and pilot sales fisheries that target upstream migrating salmon stocks. Under the FRSCS First Nation stewardship program, floating "sturgeon cages" are deployed at strategic locations near concentrations of First Nation gill netting activities. Participating First Nation fishermen place captured sturgeon in the floating enclosures; program technicians visit the cages on a daily basis and sample/tag these sturgeon prior to release.

Recapture rates in June 2002 ranged between 6-11% depending on location within the survey area. Preliminary tag recapture data suggest patterned inter-annual migrations for subsets of the total sturgeon population in the lower Fraser River. Recapture and auxiliary data suggest that observed seasonal migrations of sturgeon within the lower Fraser River may be based in part on feeding behavior and the timing of food/prey availability. Preliminary analyses indicate that observed downstream migrations of sturgeon in the spring are linked strongly to the timing and location of eulachon (*Thaleichthys pacificus*) spawning events in April and May, and that observed upstream migrations of sturgeon in the summer and fall are in response to spawning activities of Pacific salmon species (*Onchorhynchus* sp.). Other preliminary recapture and relative abundance information suggest that some portion of the white sturgeon population in the lower Fraser River stage in selected deep-water habitats during the winter (December through March).

A descriptive population model is currently under development that will, in part, provide reliable estimates of the population of white sturgeon in the lower Fraser River, by size/age group, based on tag release and recapture data. The population component of the model considers tag distribution and seasonal mixing, and is sensitive to estimates of immigration and emigration. In addition, patterns of inter- and intra-annual movement and migration, and specific feeding and over wintering behaviors, by size/age group, will be described. These data and results will be integral to the pending development of a recovery plan/strategic management plan for Fraser River white sturgeon.